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F16G 11/00

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U1S S1571

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GB 2264143 A GB 2178790 A GB 2131868 A
EP 0228656 A2

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INT CL[6] F16B 2/12 , F16G 11/00 11/04

(54) CORD GRIP

(57) A cord fastener includes an insert (1) having a head portion (2) with a first through hole (2h), a plurality of elastic legs (3) extending downward from the head portion (2) and outward projecting catches (4) formed below the opposite ends of the first through hole (2h); and a shell (11) having an insertion hole (12) the lower portion of which is tapered downward by inclined surfaces (12f) and second lateral through holes (13) communicating with the insertion hole (12) and, when the insert (1) has been fitted into the insertion hole (12), communicating with the first through hole (2h).

FIG. 9

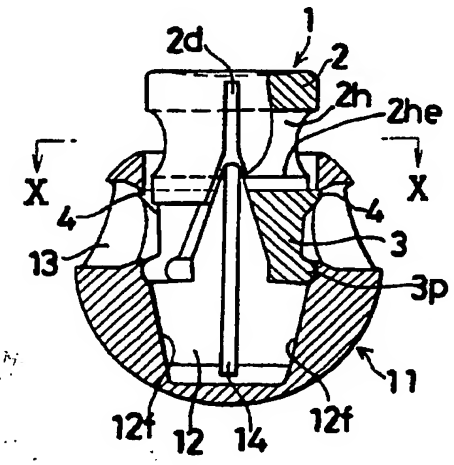

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FIG. 1

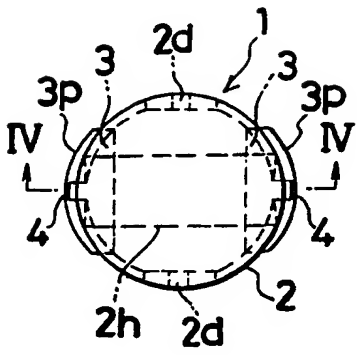

FIG. 2

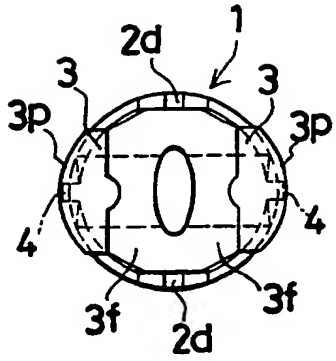

FIG. 3

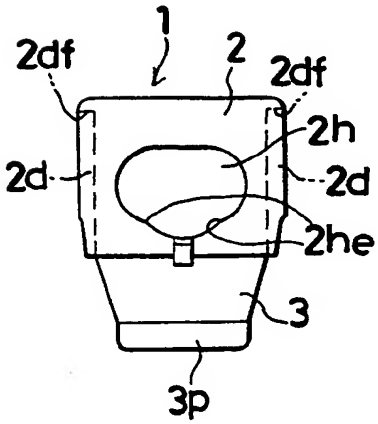

FIG. 4

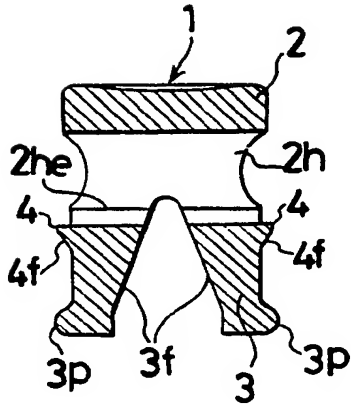

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FIG. 5

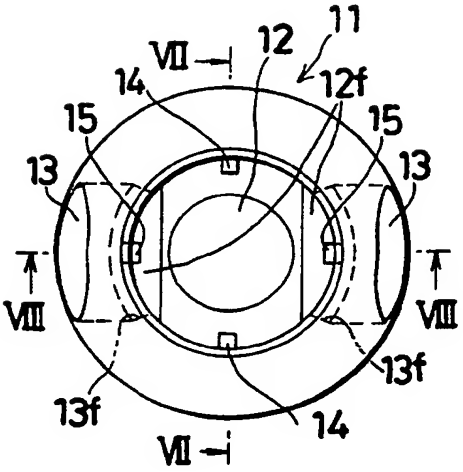

FIG. 6

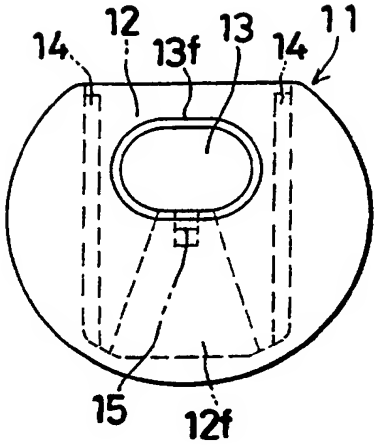

FIG. 7

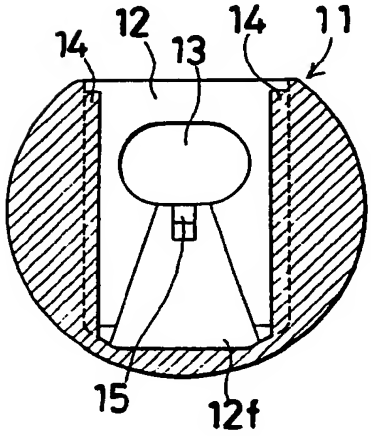

FIG. 8

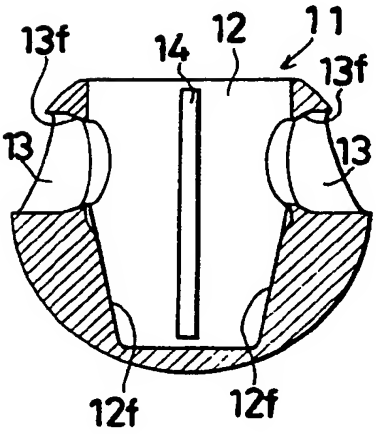

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FIG. 9

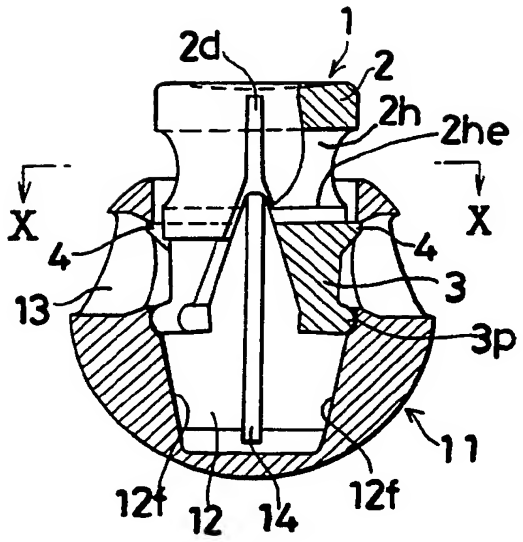

FIG.10

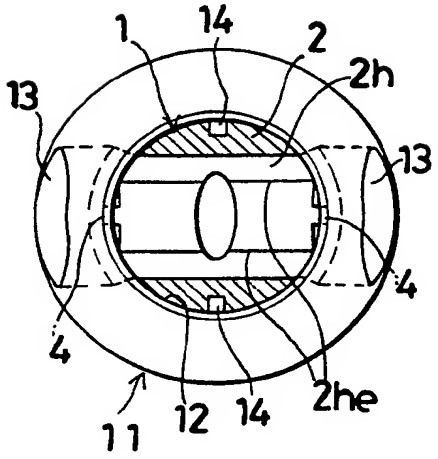

FIG.11

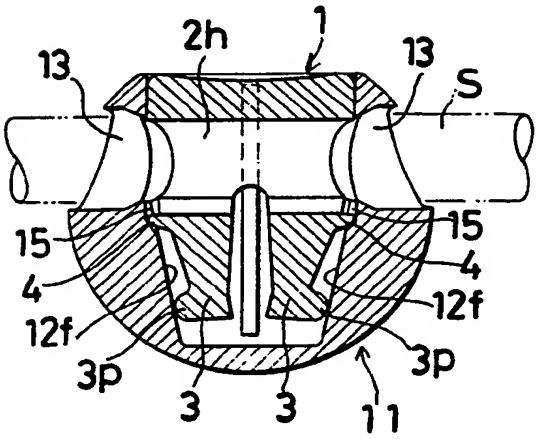

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FIG.12

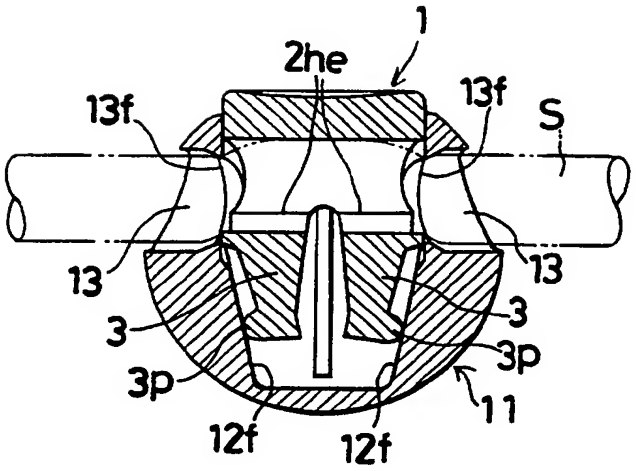

FIG.13

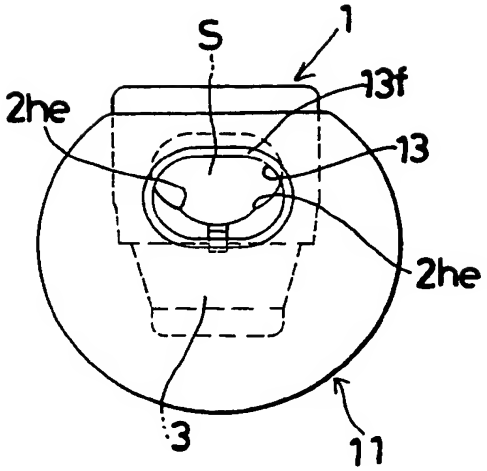

FIG.14

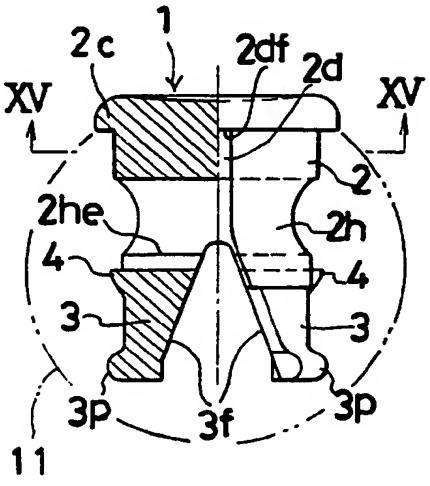

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FIG.15

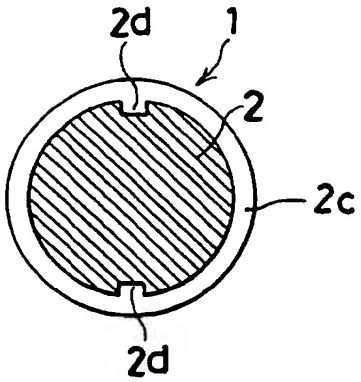

FIG.16

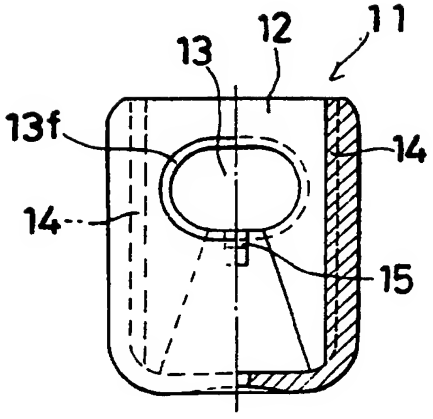

FIG.17

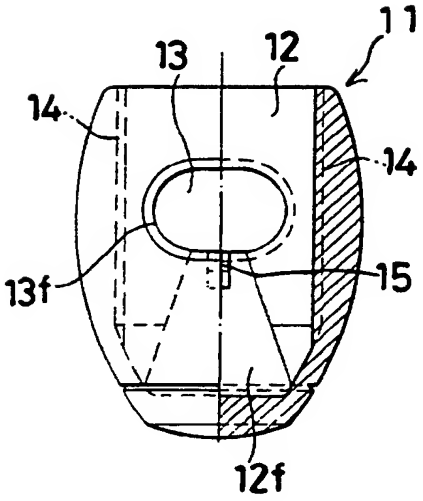

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FIG.18

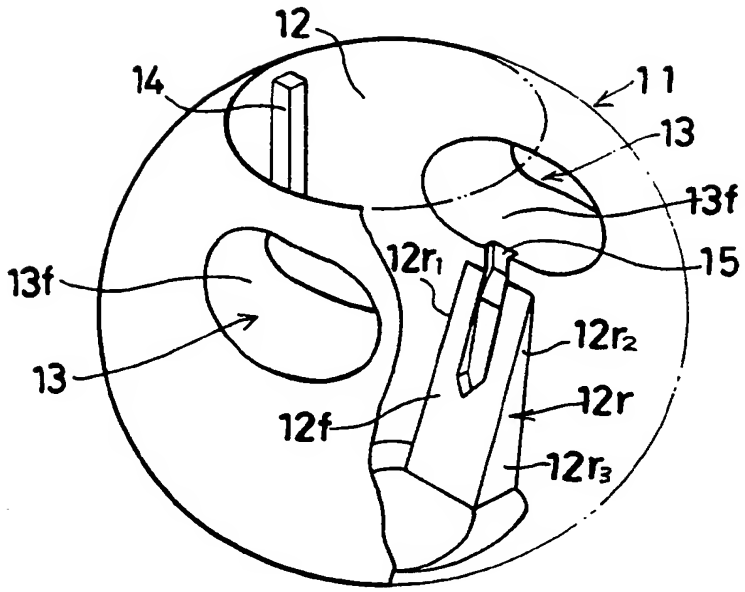
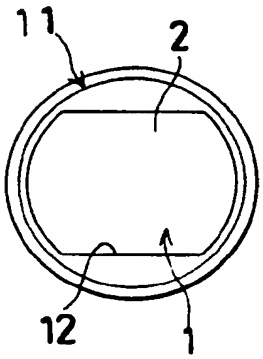


FIG.19



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Title of the Invention:

Cord fastener

This invention relates to a cord fastener used for adjusting the fastening state or fastening position of a cord of, for example, a tent, knapsack or parka.

As disclosed in Japanese Utility Model Application Public Disclosure No. Hei 1-39449, for example, one known cord fastener of this type consists of an insert having a head portion formed with a first lateral through hole and two elastic legs extending downward from the head portion and formed with protuberances that protrude outward and a shell having an insertion hole, second lateral through holes communicating with the insertion hole and, when the insert has been fitted into the insertion hole, communicating with the first lateral through hole of the insert and catches for engaging the protuberances formed to project inward below the second lateral through holes, portions of the wall defining the part of the insertion hole below the second lateral through holes being formed as inclined surfaces that taper the insertion hole inward, and a cord passed through the first and second through holes being clamped by the energising force of the elastic legs.

Consisting of only two members, the insert and the shell, this cord fastener has a small number of components. Moreover the assembly of the cord fastener is simple, only requiring insertion of the insert into the shell. In addition, the engagement of the protuberances with the underside of the catches prevents the insert and the shell from becoming separated even when no cord has been passed through the cord fastener.

Since the catches of this prior art cord fastener are located between the second lateral through holes and the inclined surfaces of the shell, however, the overall

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length of the shell is increased by an amount equal to the height of the catches.

When the shell is formed to have the exterior appearance of a sphere, moreover, the long overall length of the shell increases the exterior dimensions of the sphere and limits design freedom.

In addition, the need to provide the catches on the inner wall of the shell makes it necessary to form holes in the shell for enabling removal from the mold used for molding the catches. The appearance of the shell is therefore degraded by the presence of holes that serve no purpose in the finished product.

The present invention was accomplished for overcoming these problems of the prior art and has as its object to provide a cord fastener that consists of only two components and can be easily assembled, can prevent separation of the components even when no cord has been passed therethrough, can be fabricated to have short overall length, enjoys increased design freedom and is able to maintain a good appearance.

This invention provides a cord fastener comprising an insert having a head portion formed with a first lateral through hole and a plurality of elastic legs extending downward from the head portion, and a shell having a vertical insertion hole, the lower portion of which is tapered downward by inclined surfaces, and second lateral through holes communicating with the insertion hole and, when the insert has been fitted into the insertion hole, communicating with the first lateral through hole for permitting a cord to pass through the first and second lateral through holes, said cord fastener being characterised in that the insert is formed below opposite ends of the first lateral through hole with outward projecting catches for engagement with the second lateral holes of the shell.

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Once assembled, the aforesaid cord fastener maintains its unitary state owing to the engagement of the catches formed on the insert with the second lateral through holes of the shell. In addition, the overall length of the shell and, accordingly, the overall length of the cord fastener are reduced owing to the fact that portions of the wall of the insertion hole immediately below the second lateral through holes are formed as inclined surfaces which taper the insertion hole downward.

The above and other features of the present invention will become apparent from the following description made with reference to the drawings, in which:

Figure 1 is a plan view of the insert of a cord fastener that is a first embodiment of the invention.

Figure 2 is a bottom view of the insert of Figure 1.

Figure 3 is a side view of the insert of Figure 1.

Figure 4 is a sectional view taken along line IV-IV of Figure 1.

Figure 5 is a plan view of the shell of the first embodiment of the cord fastener according to the invention.

Figure 6 is a side view of the shell of Figure 5.

Figure 7 is sectional view taken along line VII-VII of Figure 5.

Figure 8 is a sectional view taken along line VIII-VIII of Figure 5.

Figure 9 is a front view, partially in section, showing the first embodiment of the cord fastener in the assembled state.

Figure 10 is a sectional view taken along line X-X in Figure 9.

Figure 11 is a sectional view showing how a cord is passed through the cord fastener of Figure 9.

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Figure 12 is a sectional view showing how a cord is clamped by the cord fastener of Figure 9.

Figure 13 is a side view corresponding to Figure 12.

Figure 14 is a front view of the insert of a cord fastener that is a second embodiment of the invention, showing the left half of the insert in section.

Figure 15 is sectional view taken along line XV-XV in Figure 14.

Figure 16 is a side view of the shell of a cord fastener that is a third embodiment of the invention, showing the right half of the shell in section.

Figure 17 is a side view of the shell of a cord fastener that is a fourth embodiment of the invention, showing the right half of the shell in section.

Figure 18 is a perspective view showing an inclined surface portion of the insertion hole of the shell of a cord fastener that is a fifth embodiment of the invention.

Figure 19 is a plan view of an assembled cord fastener that is a sixth embodiment of the invention.

Figure 1 is a plan view of the insert of a cord fastener that is a first embodiment of the invention, Figure 2 is a bottom view of the insert of Figure 1, Figure 3 is a side view of the insert of Figure 1 and Figure 4 is a sectional view taken along line IV-IV of Figure 1.

In these figures, reference numeral 1 designates an insert molded from a synthetic resin to have a cylindrical head portion 2, two elastic legs 3 extending down from diametrically opposed positions on the head portion 2 to serve as energising means, and catches 4.

The head portion 2 is formed with a lateral through hole 2h at the lower portion thereof and with a pair of engagement slots 2d located at diametrically opposite positions of the head portion 2 to be closed at

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their upper ends and open at their lower ends. The engagement slots 2d lie at the ends of a diameter of the head portion 2 perpendicular to the axis of the through hole 2h and the upper end surface of each engagement slot 2d lies parallel to the upper surface of the head portion 2 and constitutes a stop surface 2df.

As shown in Figures 3 and 4, the lower part of the wall defining the through hole 2h is formed with a pair of opposed ridges 2he running parallel to the axis of the through hole 2h and projecting inward.

The elastic legs 3 are approximately semicircular in section and can be flexed inward. Each is formed at its distal end with a protuberance 3p whose tip projects outward slightly beyond the outer edge of the head portion 2.

The adjacent surfaces (inner surfaces) of the two elastic legs 3 are formed as inclined surfaces 3f which diverge downwardly and whose upper ends extend into the through hole 2h of the head portion 2.

The catches 4 are formed under the opposite ends of the through hole 2h so as to bridge the head portion 2 and the elastic legs 3. Each projects slightly outward facing the radial direction of the head portion 2 and has an inclined undersurface 4f which rises as it proceeds outward.

Figure 5 is a plan view of the shell of the first embodiment of the cord fastener according to the invention, Figure 6 is a side view of the shell of Figure 5, Figure 7 is sectional view taken along line VII-VII of Figure 5, and Figure 8 is a sectional view taken along line VIII-VIII of Figure 5.

In these figures, reference numeral 11 designates a shell molded from a synthetic resin to have an outer shape resembling a truncated sphere. The shell 11 is formed at its truncated flat portion with a vertical

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insertion hole 12 for receiving the insert 1 and on its opposites sides with lateral through holes 13 which align with the through hole 2h of the insert 1 when the insert 1 is inserted in the insertion hole 12. The diameter of the insertion hole 12 is approximately the same as that of the head portion 2 of the insert 1.

Portions of the wall of the insertion hole 12 below the through holes 13 are formed as downwardly tapered inclined surfaces 12f and, as shown in Figures 5, 6 and 8, the walls defining the through holes 13 are formed as inclined surfaces 13f which taper inward.

A pair of rails 14 for engaging with the engagement slots 2d of the insert 1 are formed on the wall defining the insertion hole 12 to extend parallel to the axis of the insertion hole 12 at diametrically opposite positions offset by 90 degrees from the through holes 13.

A notch 15 is formed under each through holes 13 to open into both the insertion hole 12 and the through holes 13. The catches 4 descend into the notches 15 when the insert 1 is inserted into the shell 11.

Figure 9 is a front view, partially in section, of the cord fastener in the assembled state, Figure 10 is a sectional view taken along line X-X in Figure 9, and Figures 11, 12 and 13 are views for explaining the operation of the cord fastener. The cord is designated by reference symbol S in Figures 11 and 12.

The assembly of the insert and shell will now be explained.

First, the engagement slots 2d of the insert 1 and the rails 14 are vertically aligned and the head portion 2 is pressed down for inserting the elastic legs 3 into the insertion hole 12.

With the initial downward movement of the head portion 2, the inclined surfaces 4f of the catches 4 strike on the shell 11 causing the elastic legs 3 to elastically

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deform inward, whereby the catches 4 also move inward and enter the insertion hole 12.

With further downward movement of the head portion 2, the rails 14 engage with the engagement slots 2d, the catches 4 are forced into the through holes 13 by the elastic force (energising force) of the elastic legs 3, and the elastic legs 3 are elastically deformed inward as the protuberances 3p are pressed inward by the inclined surfaces 12f. The pressure is then removed from the head portion 2. As a result, the insert 1 is pushed upward in the shell 11 by the energising force of the elastic legs 3 so that the catches 4 engage with the upper edge portions of the inclined surfaces 13f, thus completing the assembly as shown in Figure 9.

The insert 1 of the assembled cord fastener is prevented from rotating relative to the shell 11 owing to the engagement of the rails 14 with the engagement slots 2d.

Moreover, the insert 1 is prevented from falling out of the shell 11 by the engagement of the catches 4 with the inclined surfaces 13f.

The operation for passing a cord through the cord fastener assembled in the foregoing manner will now be explained.

The insert 1 is pushed into the shell 11 by applying pressure between the upper surface of the insert 1 and the bottom surface of the shell 11 with the fingers. Owing to the engagement of the engagement slots 2d and the rails 14, the insert 1 moves down along the rails 14 until the engagement slots 2d strike against the upper ends of the rails 14 and the through hole 2h aligns the through holes 13 as shown in Figure 11.

As can also be seen in Figure 11, when the insert 1 is pushed into the shell 11 in this way the elastic legs 3 are elastically deformed inward by the force of the

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inclined surface 12f on the protuberances 3p. As a result, the elastic legs 3 store energising force and the catches 4 enter the notches 15.

After the cord S has been passed through the aligned through holes 13 and through hole 2h, the pressure forcing the insert 1 into the shell 11 is released. As shown in Figures 12 and 13, this allows the energising force of the elastic legs 3 to push the insert 1 upward within the shell 11 so that the cord S is clamped between the insert 1 and the shell 11.

When the cord S is clamped between the insert 1 and the shell 11 in this way, the energising force of the elastic legs 3 is concentrated at the ridges 2he and the inner edge (upper portion of the inner edge) of the inclined surfaces 13f defining the through holes 13.

As is clear from the forgoing, the cord fastener according to the first embodiment of the invention consists of only two components, the insert 1 and the shell 11.

Moreover, the assembly of the cord fastener is simple, only requiring insertion of the insert 1 into the shell 11, and since the engagement of the catches 4 with the through holes 13 prevents the insert 1 from falling out of the shell 11 after assembly, there is no risk of the insert 1 and the shell 11 becoming separated even when no cord has been passed through the cord fastener.

In addition, the overall length of the shell 11 and consequently of the cord fastener itself can be minimized owing to the fact that the portion under the head portion 2 is made capable of functioning as the elastic legs 3 by extending the upper ends of the inclined surfaces 3f constituting the inner surfaces thereof into the through hole 2h so as to ensure sufficient flexing room and the fact that portions of the wall of the insertion hole 12 immediately below the through holes 13 are used as the inclined surfaces 12f.

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The fact that the overall length of the shell 11 is short further means that its exterior dimensions can be kept small even if the spherical exterior appearance is retained. The degree of freedom in shell design is increased accordingly.

Moreover, the outer appearance of the assembled cord fastener is not degraded since the only holes that can be seen in the shell 11 from the outside are the through holes 13.

The cord fastener is able to clamp the cord S strongly because the energising force of the elastic legs 3 acting on the insert 1 and the shell 11 for clamping cord S therebetween is concentrated at the ridges 2he formed in the through hole 2h and the inner edges of the through holes 13 which are formed to taper inward.

Since the insert 1 and the shell 11 can therefore produce a large clamping force on the cord S even when the biasing force of the elastic legs 3 is small, it is possible to use a relatively weak energising means. As the force required to push the insert 1 into the shell 11 therefore becomes small, the risk of injury to the finger is reduced and the operability of the cord fastener is increased.

Further, passage of the cord S through the through holes 13 and the through hole 2h is easy to perform since the walls defining the through holes 13 are formed as the inclined surfaces 13f which taper inward.

Figure 14 is a front view of the insert of a cord fastener that is a second embodiment of the invention, showing the left half of the insert in section, and Figure 15 is sectional view taken along line XV-XV in Figure 14. Portions the same as or similar to those in Figures 1 - 13 are assigned the same reference symbols as those in Figures 1 - 13 and will not be explained further.

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The insert 1 of this second embodiment differs from the insert 1 of the first embodiment in that a large-diameter portion 2c of a diameter slightly larger than that of the insertion hole 12 is provided on top of the head portion 2.

The other parts of the insert 1 of the second embodiment are the same as those of the insert 1 of the first embodiment.

The second embodiment therefore provides the same effects as the first and, in addition, has increased operability because it provides a larger surface for the finger to press at the top of the head portion 2.

Figure 16 is a side view of the shell of a cord fastener that is a third embodiment of the invention, showing the right half of the shell in section. Portions the same as or similar to those in Figures 1 - 15 are assigned the same reference symbols as those in Figures 1 - 15 and will not be explained further.

The shell 11 of this third embodiment differs from the shell 11 of the first embodiment in that it has the outer appearance of a cylinder. Like the shell 11 of the first embodiment it also is provided with the insertion hole 12 tapered by the inclined surfaces 12f from below the through holes 13, the through holes 13 tapered inward by the inclined surfaces 13f, the rails 14 and the notches 15.

The third embodiment therefore provides the same effects as the first.

Figure 17 is a side view of the shell of a cord fastener that is a fourth embodiment of the invention, showing the right half of the shell in section. Portions the same as or similar to those in Figures 1 - 16 are assigned the same reference symbols as those in Figures 1 - 16 and will not be explained further.

The shell 11 of this fourth embodiment differs from the shell 11 of the first embodiment in that it has

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the outer appearance of a football. Like the shell 11 of the first embodiment it also is provided with the insertion hole 12 tapered by the inclined surfaces 12f from below the through holes 13, the through holes 13 tapered inward by the inclined surfaces 13f, the rails 14 and the notches 15.

The fourth embodiment therefore provides the same effects as the first.

Figure 18 is an enlarged perspective view showing an inclined surface portion of the insertion hole of the shell of a cord fastener that is a fifth embodiment of the invention. Portions the same as or similar to those in Figures 1 - 17 are assigned the same reference symbols as those in Figures 1 - 17 and will not be explained further.

The shell 11 of this fifth embodiment differs from the shell 11 of the first embodiment in that the inclined surfaces 12f which downwardly taper the lower part of the insertion hole 12 are formed by U-shaped lugs 12r (only one shown in Figure 18). Like the shell 11 of the first embodiment the shell 11 of the fifth embodiment is also provided with the through holes 13 tapered inward by the inclined surfaces 13f, the rails 14 and the notches 15.

Each of the U-shaped lugs 12r consists of two narrow lug portions $12r_1$, $12r_2$ on opposite sides of a groove and a lug portion $12r_3$ having three times the width and about the same length as the lug portions $12r_1$, $12r_2$. The lug portions $12r_1$, $12r_2$ and the lug portion $12r_3$ are formed as an integral body.

Owing to this configuration, the fifth embodiment not only has the same effects as the first embodiment but also has improved operability owing to the formation of the inclined surfaces 12f by the U-shaped lugs 12r and enables a reduction in the amount of synthetic resin required for molding the shell 11 owing to the fact that the wall portions other than those at which the U-shaped lugs 12r are formed can be reduced in thickness. Additional

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advantages are that the U-shaped lugs 12r act as beams which increase the strength of the shell and that the groove formed between the lug portions $12r_1$, $12r_2$ reduce friction with the elastic legs 3.

Figure 19 is a plan view of cord fastener that is a sixth embodiment of the invention. Portions the same as or similar to those in Figures 1 - 18 are assigned the same reference symbols as those in Figures 1 - 18 and will not be explained further.

The sixth embodiment differs from the first in that the head portion 2 is oval in cross section, the engagement slots 2d are omitted, the insertion hole 12 has an oval cross section matched to that of the head portion 2, and the rails 14 are omitted.

Line the first embodiment, it is provided with the through hole 2h having the ridges 2he, the elastic legs 3, the catches 4, the insertion hole 12 tapered by the inclined surfaces 12f from below the through holes 13, the through holes 13 tapered inward by the inclined surfaces 13f, the rails 14 and the notches 15.

The configuration of the insert 1 and the shell 11 as in this sixth embodiment also prevents the insert 1 from rotating relative to the shell 11.

Although the foregoing embodiments relate to examples in which the shell 11 is provided with the notches 15 for receiving the catches 4, the notches 15 need not be provided if the inclined surfaces 12f push the elastic legs 3 far enough inward to prevent the catches 4 from striking on the edge of the insertion hole 12.

The inclined surfaces 12f of the first to fourth and sixth embodiments can be formed as U-shaped lugs 12r in the manner fifth embodiment.

Although the sixth embodiment relates to an example in which the insert 1 is prevented from rotating relative to the shell 11 by giving the head portion 2 and

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the insertion hole 12 oval cross-sections, the same effect can also be achieved by giving them any of various other noncircular cross-sections such as square or D-shaped.

Thus the present invention makes it possible to reduce the number of components two only two: the insert and the shell.

Moreover, the assembly of the cord fastener is simple, only requiring insertion of the insert into the shell 11.

In addition, since the engagement of the catches with the edges of the through holes of the shell prevents the insert from falling out of the shell after assembly, there is no risk of the insert and the shell becoming separated even when no cord has been passed through the cord fastener.

Further, since the overall length of the shell can be shortened, the exterior dimensions can be kept small even if the spherical exterior appearance is retained. The degree of freedom in shell design is increased accordingly.

Moreover, the outer appearance of the assembled cord fastener is not degraded since the only holes that can be seen from the outside are the through holes of the shell.

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Claims:

1. A cord fastener comprising an insert having a head portion formed with a first lateral through hole and a plurality of elastic legs extending downward from the head portion, and a shell having a vertical insertion hole, the lower portion of which is tapered downward by inclined surfaces, and second lateral through holes communicating with the insertion hole and, when the insert has been fitted into the insertion hole, communicating with the first lateral through hole for permitting a cord to pass through the first and second lateral through holes,

said cord fastener being characterised in that the insert is formed below opposite ends of the first lateral through hole with outward projecting catches for engagement with the second lateral holes of the shell.

2. A cord fastener according to claim 1, characterised in that the head portion is provided on its top with a large-diameter portion.

3. A cord fastener according to claim 1, characterised in that each of the plurality of elastic legs extending downward from the head portion is formed at its lower end with an outwardly projecting protuberance.

4. A cord fastener according to claim 1, characterised in that the inner surface of each the plurality of elastic legs is formed as an inclined surface which diverges downwardly and whose upper end extends into the first lateral through hole.

5. A cord fastener according to claim 1, characterised in that the head portion is oval in cross section and the insertion hole is oval in cross section.

6. A cord fastener according to claim 1, characterised in that the inclined surfaces which taper the lower portion of the insertion hole downward are connected with the lower edges of the second lateral through holes.

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7. A cord fastener according to claim 1, characterised in that the walls of the second lateral through holes are formed as inwardly tapered inclined surfaces.

8. A cord fastener substantially as hereinbefore described with reference to and as shown in Figs. 1 to 13 or Figs. 14 and 15, or Fig. 16, or Fig. 17, or Fig. 18, or Fig. 19 of the accompanying drawings.

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Databases (see below)
(i) UK Patent Office collections of GB, EP, WO and US patent specifications.

(ii)

Documents considered relevant following a search in respect of Claims :-
ALL

Categories of documents

X: Document indicating lack of novelty or of inventive step.

Y: Document indicating lack of inventive step if combined with one r more other documents of the same category.

A: Document indicating technological background and/or state of the art.

P: Document published on or after the declared priority date but before the filing date of the present application.

E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.

&: Member of the same patent family; corresponding document.

Category	Identity of document and relevant passages	Relevant to claim(s)
X, Y	EP 0228656 A2 (YOSHIDA KOGYO)	1, 3, 5, 6
Y	GB 2264143 A (YOSHIDA KOGYO)	1, 2, 3
Y	GB 2178790 A (FILDAN)	2
Y	GB 2131868 A (FIXFABRIKEN)	1, 2
	see whole document in each case	

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